Section:
OPTICAL TECHOLOGIES IN BIOPHYSICS & MEDICINE XXV

Title:
Early prediction of rat hindlimb ischemia using a steady-state spatially resolved visible diffuse reflectance spectrosopy

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Abstract:

In modern biological tissue imaging it is vitally important to promptly determine tissue pathologies like tissue ischemia that may occur during surgery. Over the past few years, more and more researches have been developed on the early prediction of tissue ischemia using a spatially resolved steady state visible diffuse reflectance spectrosopy (srDRS). srDRS is one of the methods of optical bioimaging based on the ability of tissue chromophores (oxyhemoglobin, deoxyhemoglobin, lipids, collagen and etc.) to absorb diffusely scattered light of a definite wavelength. srDRS shows a great potential of assessing tissue parameters, chromophore concentration and complementary tissue status. For this research we used srDRS method for early prediction of ischemia in rat hindlimb model within 30 minutes. The quartz fibers as a part of the sapphire probe were used as radiation delivery, which allows using the probe intra-operative for rapid tissue blood circulation monitoring due to the unique properties of sapphire - its corrosion resistance, strength and bioinertness. In our study, we used the rat hindlimb ischemia model (the femoral artery ligitation and further monitoring of changes in parameters) due to muscle tissue of the rat limb is the most accessible and convenient for measurements and meets all the requirements for the research model for this research.